ACMG American College of Medical Genetics and Genomics
Translating Genes Into Health®

ACT Sheet

Newborn Screening ACT Sheet

[Increased Guanidinoacetate]

Guanidinoacetate Methyltransferase Deficiency

Differential Diagnosis: None.

Condition Description: Guanidinoacetate methyltransferase (GAMT) deficiency is an autosomal recessive condition caused by deficient GAMT activity, impairing the ability to synthesize creatine by methylation of guanidinoacetate. Without creatine, the body is unable to use and to store energy. This inability to utilize and store energy affects brain and muscle function, causing seizures, developmental delay, impaired speech development, behavioral changes, hypotonia, and movement disorders.

You Should Take the Following Actions:

- Inform family of the newborn screening result.
- Ascertain clinical status (newborns are expected to be asymptomatic).
- Consult with pediatric metabolic specialist.
- Evaluate the newborn (newborns are expected to be asymptomatic).
- Initiate confirmatory/diagnostic testing and management, as recommended by the specialist.
- Provide the family with basic information about GAMT deficiency and its management.

- Report final diagnostic outcome to newborn screening program.

Diagnostic Evaluation: Guanidinoacetate: urine and plasma levels are characteristically increased. Creatine and creatinine: urine and plasma levels are (relatively) low. Molecular genetic testing: may be required to confirm the diagnosis.

Clinical Considerations: GAMT deficiency typically presents between 3 months to 3 years of age with developmental delay, hypotonia, seizures, and behavioral disorders, such as autism or self mutilation. About 30% of patients have a movement disorder such as ataxia or have other involuntary movements. Treatment is directed at promoting normal growth and development by the restoration of creatine levels and the reduction of guanidinoacetate. This is accomplished by creatine supplementation and reduction of guanidinoacetate concentrations using protein restriction, ornithine and benzoate supplementation. Dietary therapy should be administered under the guidance of a metabolic specialist.

Additional Information:

How to Communicate Newborn Screening Results
Gene Reviews
GARD
Medline Plus
Condition Information for Families- HRSA Newborn Screening Clearinghouse

Referral (local, state, regional, and national):

Find a Genetics Clinic Directory
Genetic Testing Registry

Disclaimer: This practice resource is designed primarily as an educational resource for medical geneticists and other clinicians to help them provide quality medical services. Adherence to this practice resource is completely voluntary and does not necessarily assure a successful medical outcome. This practice resource should not be considered inclusive of all proper procedures and tests or exclusive of other procedures and tests that are reasonably directed to obtaining the same results. In determining the propriety of any specific procedure or test, the clinician should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen. Clinicians are encouraged to document the reasons for the use of a particular procedure or test, whether or not it is in conformance with this practice resource. Clinicians also are advised to take notice of the date this practice resource was adopted, and to consider other medical and scientific information that becomes available after that date. It also would be prudent to consider whether intellectual property interests may restrict the performance of certain tests and other procedures.

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State and Other Resources

State Newborn Screening Program

Metabolic (Bloodspot) Screening, Montana's Newborn Screening Programs
406-444-0984, dphhs.mt.gov/ecfsd/cshs/newbornscreeningprograms/

Short-term Follow-up Coordinator - Crystal Fortune, MT Laboratory Services Bureau
406-444-0930 or 800-821-7284 cfortune@mt.gov

Genetics/Metabolics Consultants

Shodair Children's Hospital Medical Genetics Staff will contact you with recommendations.
Metabolic Clinic: 406-444-1099; Clinics held across Montana: 406-444-1016
shodair.org/about-shodair/contact/

If emergency consultation with a metabolic specialist is necessary, contact One Call (24/7) at Children's Hospital Colorado (800-525-4871) and ask to speak to the metabolic specialist on call.

Information for Clinicians and Families

Montana Medical Home Portal (see also the Parents & Families section)
mt.medicalhomeportal.org/newborn/guanidinoacetate-methyltransferase-deficiency

Parent/Family Support

Association for Creatine Deficiencies
creatineinfo.org

National Resources (with web addresses)

Additional Information

How to Communicate Newborn Screening Results
www.hrsa.gov/sites/default/files/hrsa/advisory-committees/heritable-disorders/Resources/achdnc-communication-guide-newborn.pdf

Gene Reviews
www.ncbi.nlm.nih.gov/books/NBK3794/

Genetic and Rare Diseases Information Center (GARD)
rarediseases.info.nih.gov/diseases/2578/guanidinoacetate-methyltransferase-deficiency

Medline Plus
medlineplus.gov/genetics/condition/guanidinoacetate-methyltransferase-deficiency/

Condition Information for Families-HRSA Newborn Screening Clearinghouse
newbornscreening.hrsa.gov/conditions/guanidinoacetate-methyltransferase-deficiency

Referral (local, state, regional and national)

Find a Genetics Clinic Directory
clinics.acmg.net

Genetic Testing Registry
www.ncbi.nlm.nih.gov/gtr/

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